[Review of] Concepts and categories: Foundations for sociological and cultural analysis, by Michael T. Hannan, Gaël Le Mens, Greta Hsu, Balázs Kovács, Giacomo Negro, László Pólos, Elizabeth Pontikes, and Amanda J. Sharkey. New York: Columbia University Press, 2019.

Concepts and Categories: Foundations for Sociological and Cultural Analysis by **Michael Hannan, Gaēl Le Mens, Greta Hsu, Balázs Kovács, Giacomo Negro, Lázló Pólos, Elizabeth Pontikes and Amanda Sharkey**. New York: Columbia University Press., 2019. 328 pp. $35.oo Hardcover ISBN: 9780231192729

Candace Jones

University of Edinburgh

Candace.Jones@ed.ac.uk

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The newly authored ***Concept and Categories*** by Hannan and colleagues offers an engaging, thorough and accessible discussion of concepts and categories, and link these to key sociological concerns and approaches. The authors provoke new insights into foundational sociological research, and offer new paths forward for research. There are five key benefits to the sociological reader: (1) the focus on concepts and categories and explore these through semantic space; (2) the integration of psychology and sociological research as the foundation for cognition and culture; (3) useful examples throughout to illustrate key arguments; (4) the formalization of arguments with mathematical equations that build as the arguments evolve throughout the book; and (5) useful appendices for mathematical symbols, sources and deeper explanation

The book is divided into key sections: (1) Concepts in Sociological Analysis, (2) Concepts and Spaces, (3) Applying Concepts, (4) Bridges to Sociological Application, (5) Concepts in Social Interaction and ends with Appendices. In the book's preface, the authors define key constructs of concepts and categories and outline the underlying assumption about how concepts and categories are linked. "Concepts are mental representations by which people classify the

entities they encounter. A category is a set of objects that have been recognized as fitting the concept. How an object is categorized is the realization of a probabilistic process that depends on the set of concepts a person holds [as well as] social and environmental factors….We develop a theory of social categories based on an explicit model of how humans use concepts" (p. ix-x).

The authors point the readers to three building blocks for their theory: (1) from psychology, they use Eleanor Rosch's work on concepts and James Hampton's research on typicality and conceptual combination; (2) from computational linguistics, they draw on the geometry of concepts by Dominic Widdows and Peter Gärdenfors, and (3) from methodology, they apply "Bayesian work on categorization as optimal statistical inference" (p. xi). Later in the book, the authors elaborate these three strands, link them to sociological approaches and concerns, and formalize these relations in mathematical language equates with proofs in the appendix.

Concepts structure perception, which in most cases, socially constructed, may diverge or converge across individuals and groups, and are infused with value that underpins evaluation. When concept structures convergence, there is consensus or shared perceptions and categorizations across individuals and/or groups. The authors, given their ecological grounding, marry the notion of consensus with the notion of population: "a population consists of organizations that relevant agents regard as members of a common category at a given point in time" (p. 4). Their approach seeks to examine when and how consensus arises and the social consequences of consensus and divergence in categories, such as when and why category spanning generally results in a discount to those who engage in it.

Conceptual space is "defined by a set of relevant features" and where meaning is located (p. 8). Their key insight is that categorizations are revealed by their positions and distances in space: concepts that share features are closer as are objects that are categorized as an instance of the

concept whereas distinctiveness is revealed by the degree of difference among a concept or object from its cohort. Thus, typicality refers to when an object is a full-fledged member of a category and is revealed by the similarity or differences in semantic space to other objects categorized as instances of the concept. Because concepts can be measured and revealed through categorization behavior, a concept and its features that are typical have maximal probability densities whereas those that are atypical have lower probability densities.

Two key assumptions are explored throughout the book. First that concepts are unobservable and thus people learn about concepts by watching how others categorize objects to concepts. Second, that taken-for-grantedness—a key concept in sociology—can be revealed and better defined through semantic space. They argue that people update beliefs when individuals believe that the group shares a common understanding of the concept, which they deduce from observing categorization behavior.

There are excellent chapters that explore core constructs and processes. There is not space in the review to highlight them all. Free Categorization is the behavior that most individuals engage in everyday life; people use and apply multiple categorizations to objects. Free categorization requires that we distinguish between when a categorization is a compound or a combination. A compound is sub-concept that modifies the primary concept, such as cellar door or porch swing, where cellar modifies door and porch modifies swing, revealing types of doors and swings. A combination, in contrast, is an instance of two categorizations being combined in new way, sitting "between concepts in semantic space in positions that have not yet been conceptualized" (p. 127). A compound helps us understand when a concept is being extended whereas a combination indicates innovations that either have not or are in the process of being

conceptualized. Compounds and combinations involve different categorization behaviors and may have distinct challenges and consequences.

Conceptual ambiguity is when an object overlaps or is associated in conceptual space with many other objects, which they call “categorical niche width”. They suggest that penalties for category spanning partly stem from negative emotional reactions and that a lack of penalty may be due to how some individuals are intrigued by or value combinations. Future research may seek to explain under what conditions penalties or rewards accrue for category spanning, how positive and negative emotional responses to categorizing behaviors drive different consequences and sociological processes over time.

In the current book, the authors build extensively on their individual and collective past research and integrate their ecological approach with categorization research. Since the authors’ goal is to build “a Sociology of Concepts and Categories” (p. 2), a puzzle is why the book does not integrate the research of sociology of culture scholar who formalize semantic and social relations, such as Ronald Breiger, John Mohr, and Harrison White. For example, John Mohr (1998) articulated an approach to meaning structures and his empirical work analyzed language and distances between categorizing people to understand how a concept, such as poverty, changed to reveal who was considered deserving and undeserving (Mohr and Duquenne 1997). There is an opportunity for sociologists to bridge two vital research streams within sociology—cultural sociology and organizations, occupations and work—to advance our understanding of how concepts and categorization within and across semantic, social and structural relations. The book advances sociological scholarship by offering new insights and a systematic research approach to better understand areas of key sociological concern.

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